SPACEX

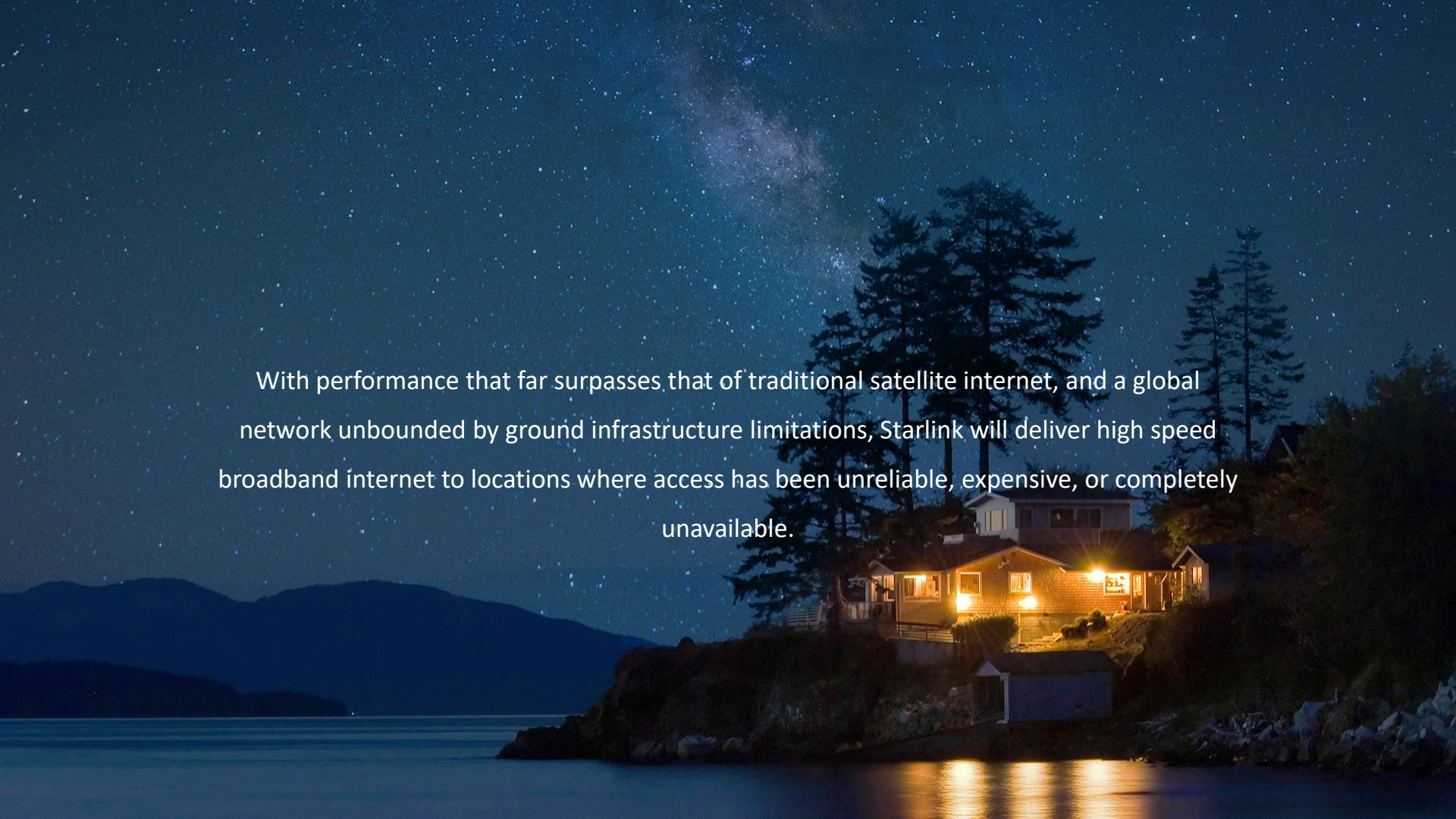
Rural Digital Opportunity Fund

STARLINK

SpaceX is leveraging its experience in building rockets and spacecraft to deploy the world's most advanced broadband internet system.

Only company with capability to recover and reuse orbital rockets

First stage boosters land back on land or at sea on SpaceX’s autonomous spaceport drone ships



With performance that far surpasses that of traditional satellite internet, and a global network unbounded by ground infrastructure limitations, Starlink will deliver high speed broadband internet to locations where access has been unreliable, expensive, or completely unavailable.

EFFICIENT, COMPACT DESIGN

allows for approximately 60 satellites to launch on each Falcon 9 rocket, enabling rapid constellation deployment

High-Speed, Low-Latency Satellite Broadband

The FCC licensed SpaceX to operate 4,409 satellite in the Ku- and Ka- spectrum bands.

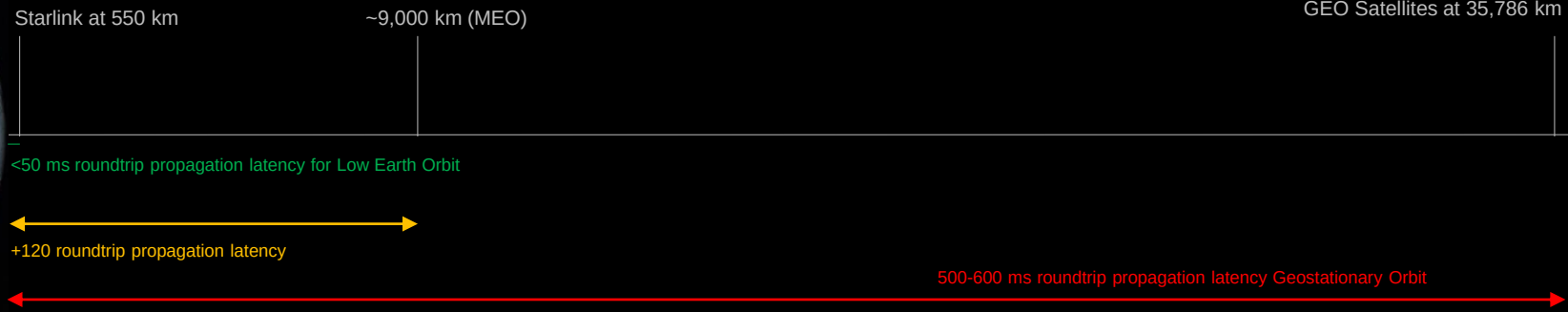
Low Latency:

- Satellite latency is driven by altitude.
- By operating at 550 km orbits, SpaceX's system can deliver high-speed broadband at total latency below 50 ms.

High-Throughput:

- Advanced phased-array antennas allow system to automatically steer beams to optimize service to certain locations.
- System can dynamically adjust its capacity in certain locations to match consumer demand and regulatory requirements.
- Smaller spot sizes:
  - More efficient spectrum re-use
  - Fewer users sharing same throughput means more throughput per user
  - More deployed throughput

Comparison of distance between Low Earth Orbit and Geostationary Satellite Systems



Commission Rules Strike Appropriate Balance

- Commission rules “favor[] faster services with lower latency and encourages intermodal competition in order to ensure that the greatest possible number of Americans will be connected to the best possible networks, all at a competitive cost.”
- The Commission set a careful balance that encourages intermodal competition, while discouraging any operator from overpromising service, regardless of technology.
  - Letter of Credit
  - Reporting Requirements
  - Withholding support
  - Cost recovery

Commission Support for SpaceX Service to Underserved/Unserved Areas

- "Grant of this modification will allow SpaceX to make efficient use of valuable spectrum resources more safely, quickly, and cost-effectively as it initiates a new generation of broadband services available to customers worldwide, including those in areas previously underserved or even totally unserved by other broadband solutions."—*International Bureau approval of SpaceX license modification* (April 26, 2019)
- "Grant of this application will allow SpaceX to accelerate the deployment of its satellite constellation to deliver broadband service throughout the United States, especially to those who live in areas underserved or unserved by terrestrial systems."—*International Bureau approval of SpaceX license modification (December 19, 2019)*
- "Grant of this application will enable SpaceX to provide both diverse geographic coverage and the capacity to support a wide range of broadband and communications services for residential, commercial, institutional, governmental and professional users in the United States and globally."—Commission (November 15, 2019)

Support for SpaceX High-Speed/Low-Latency Service

- SpaceX's license will "unleash the power of satellite constellations to provide high-speed Internet to rural Americans. If adopted, it would be the first approval given to an American-based company to provide broadband services using a new generation of low-Earth orbit satellite technologies."—Chairman Pai (February 14, 2018)
- "Companies developing satellite constellations like these have sky-high ambitions: to deliver fast, low-latency broadband services to millions in the United States and around the world. This meshes well with the FCC's twin goals of closing the digital divide and promoting innovation."—Chairman Pai (July 19, 2019)
- "Not since the early 1990s have satellite systems received such attention and captured the imagination of what new technologies, including high-speed broadband offerings, may bring."—Commissioner O'Rielly (November 19, 2019)
- SpaceX and others "promise lower latency connections because they typically orbit only a few hundred miles above Earth, as opposed to many thousands. Many corners of our country that don't have broadband today, or don't have many broadband choices, could soon see new, high-speed services thanks to these low-earth orbit satellites."—Commissioner Carr (November 19, 2019)
- "These new providers promise widespread highspeed coverage while reducing latency to the tens of milliseconds – fast enough to support voice and other critical services."—Commissioner Starks (July 25, 2019)